Drinking Water Wells & Septics

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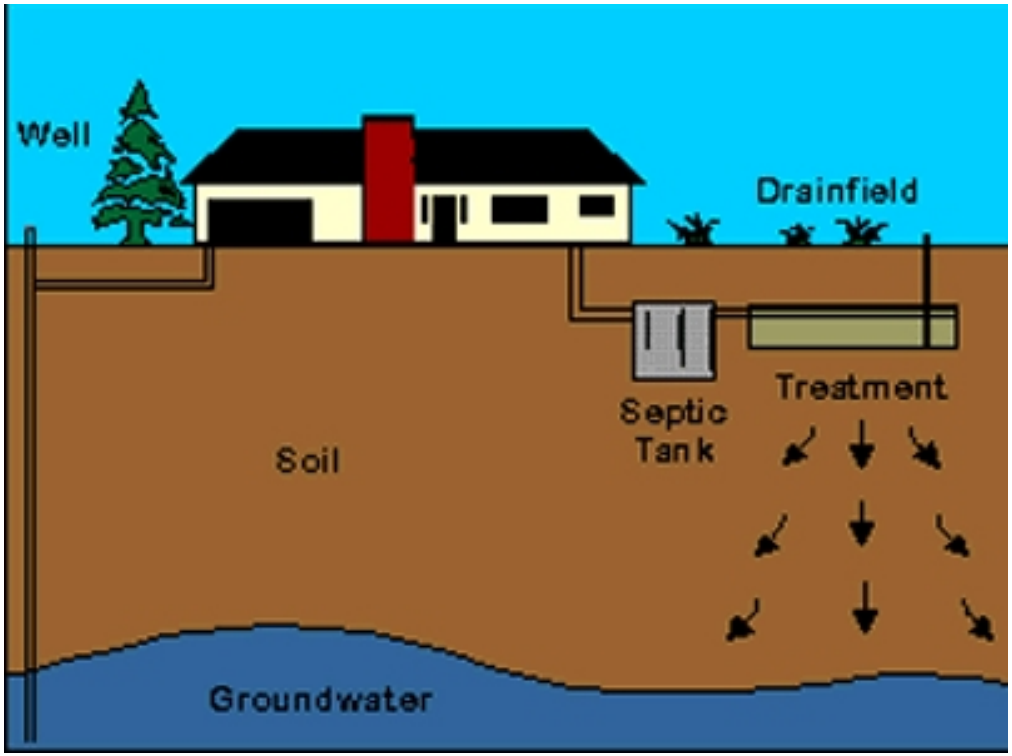
(406) 444-4806

What we'll cover:

- Introductions
- How the water samples handled
- Why do these workshops
- When to ask questions
- Handout materials
- Water Wells
- Septic Systems

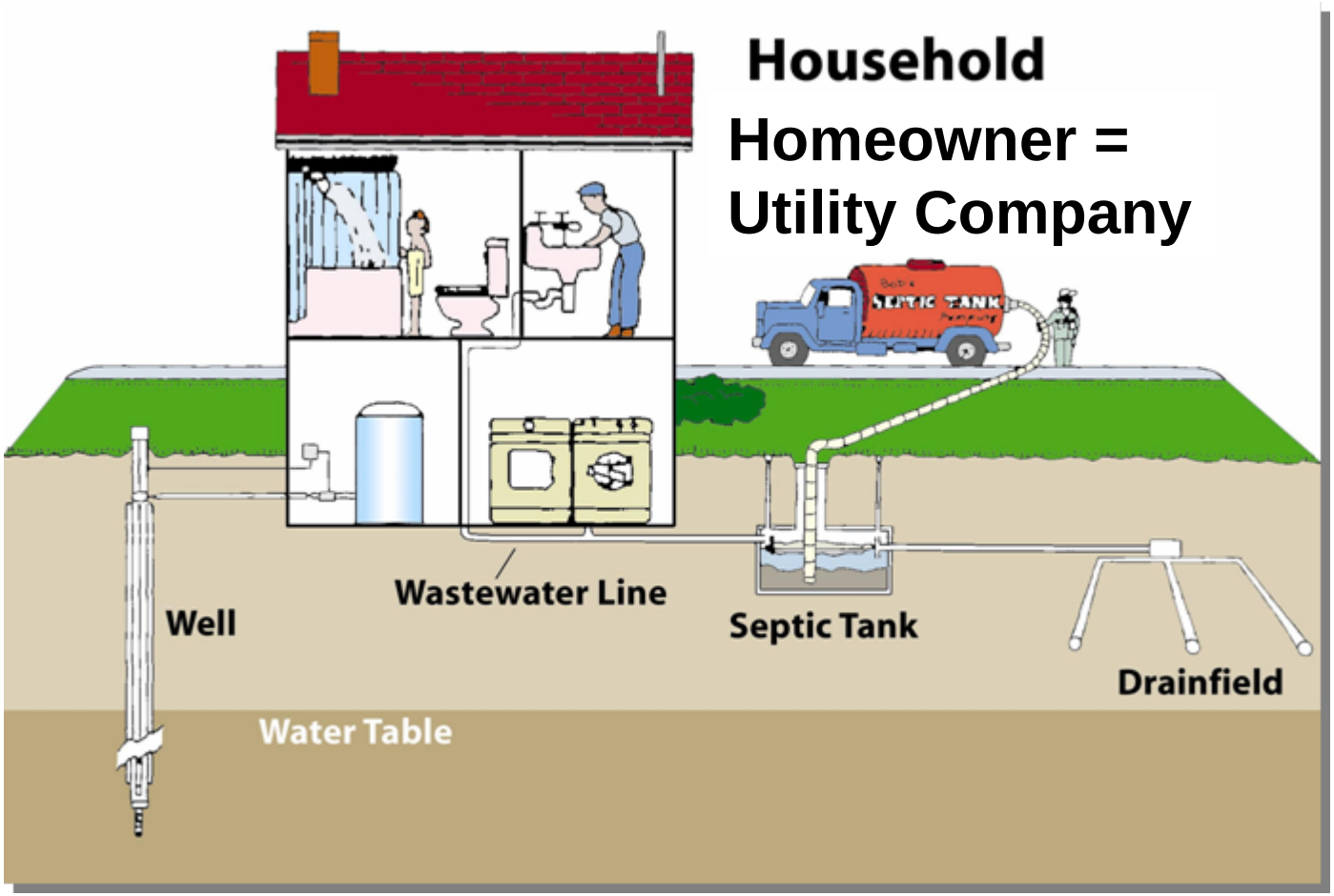
Main Point –Septic Systems Recharge Aquifers



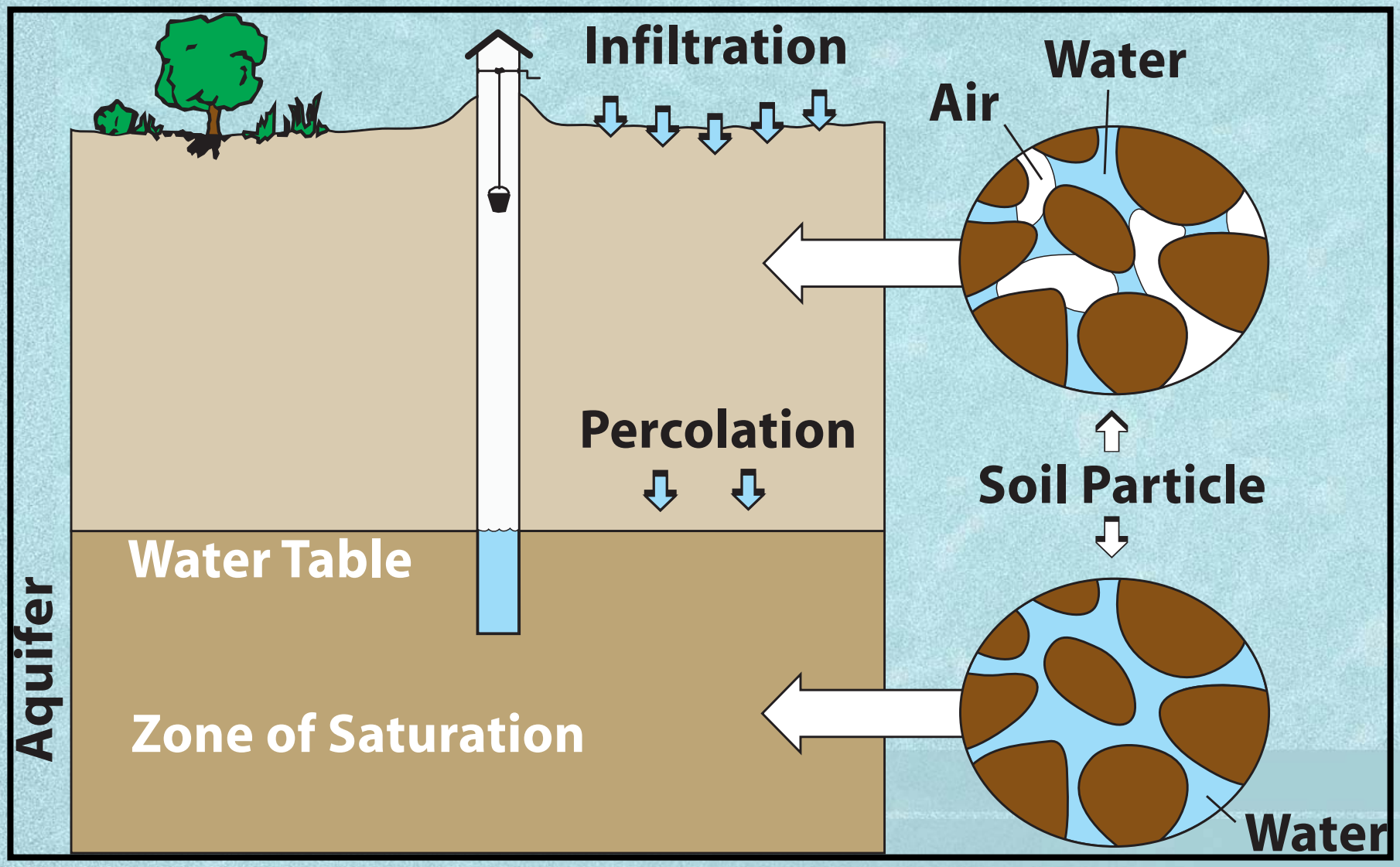
Main Point –Wells Need Maintenance

Main Point –Water Quality Monitoring Protects Health

Main Point – You are a Utility Company

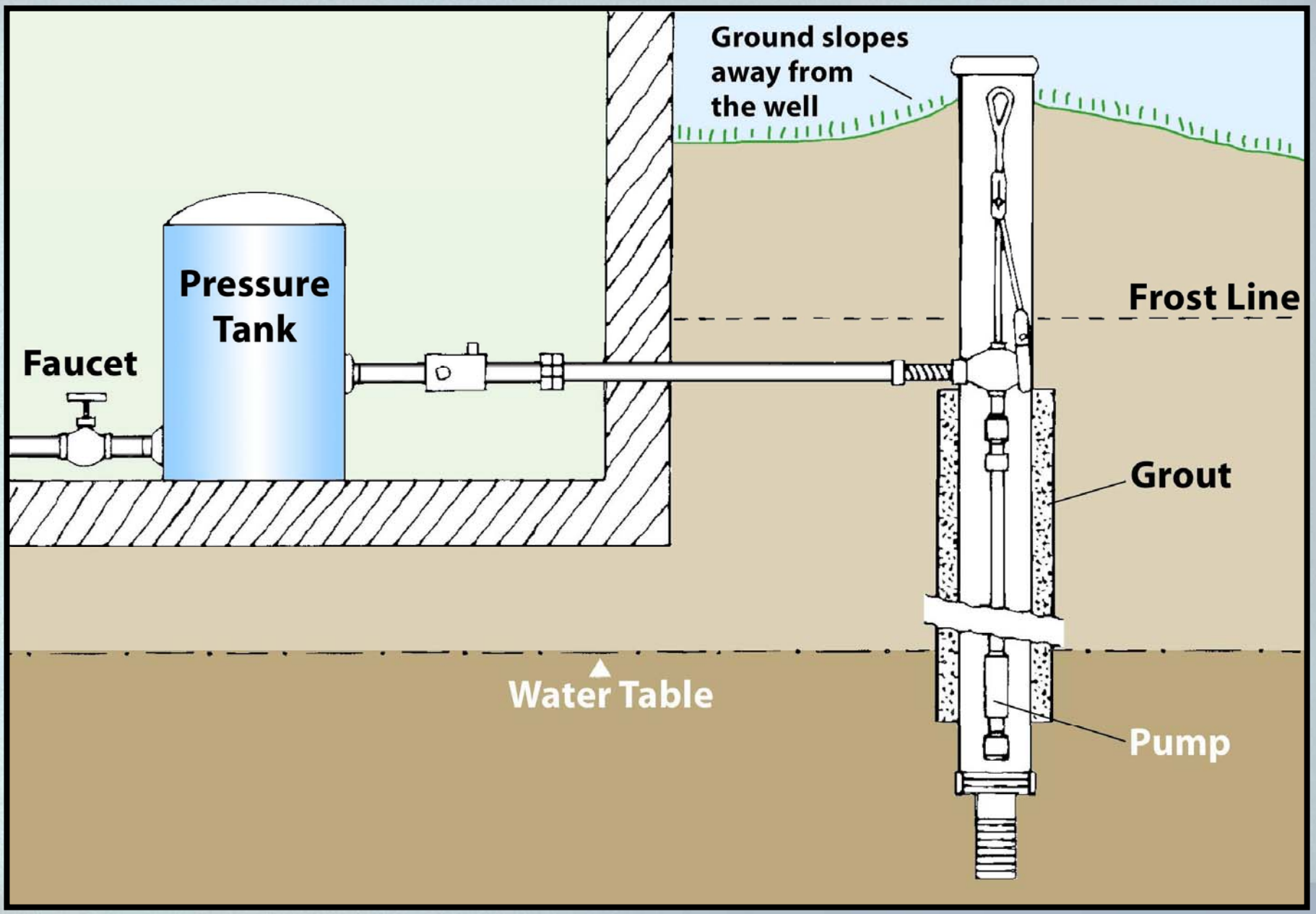


What is a Well? Aquifer?

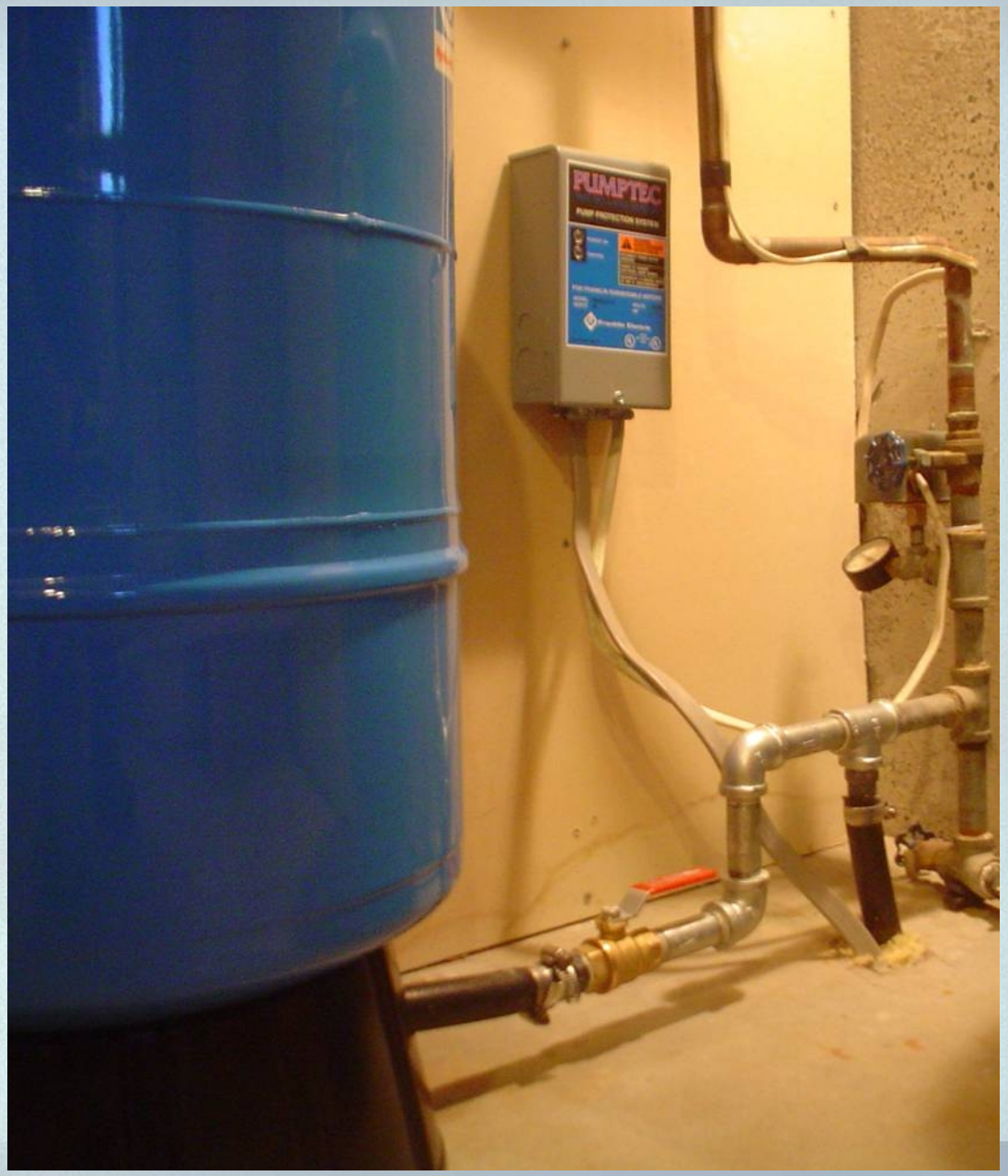


Typical Well System Parts

- Well
- Supply line to house
- Pressure control and gauge
- Control box (three wire pumps)
- Pressure tank
- Gate or shut off valve
- Drain valve
- House plumbing


Ground slopes
away from
the well
Pressure
Tank
Faucet
Frost Line
Grout
Water Table
Pump

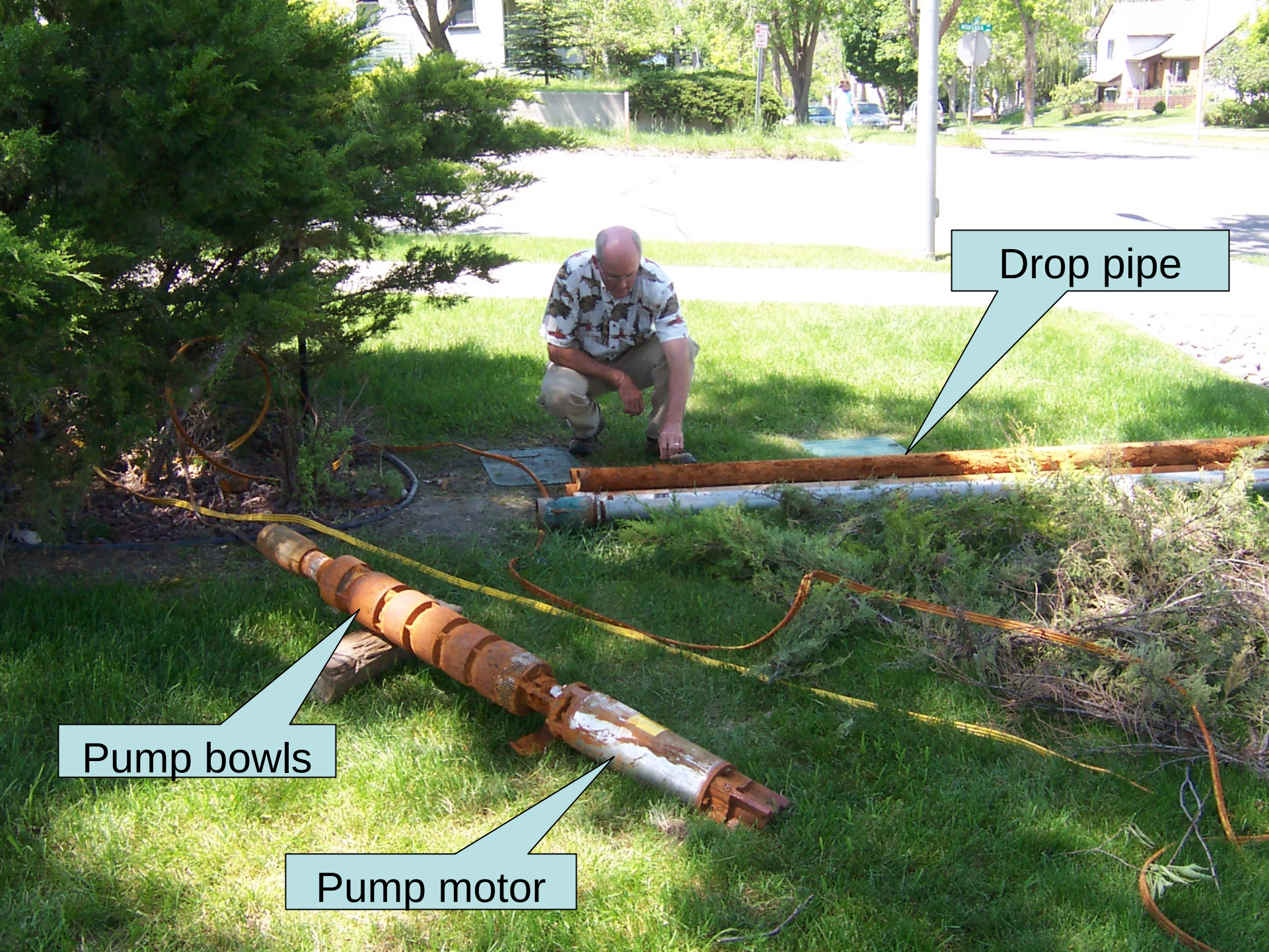
Typical household system



Well System Operation

- **Pump run time > 1 minute**
- **Period between cycle > 3 minutes**
- **Checking for “waterlogged” tank**
- **Pressure ranges 20-40 or 30-50 psi are typical.**


Let’s look at the internal components of a well

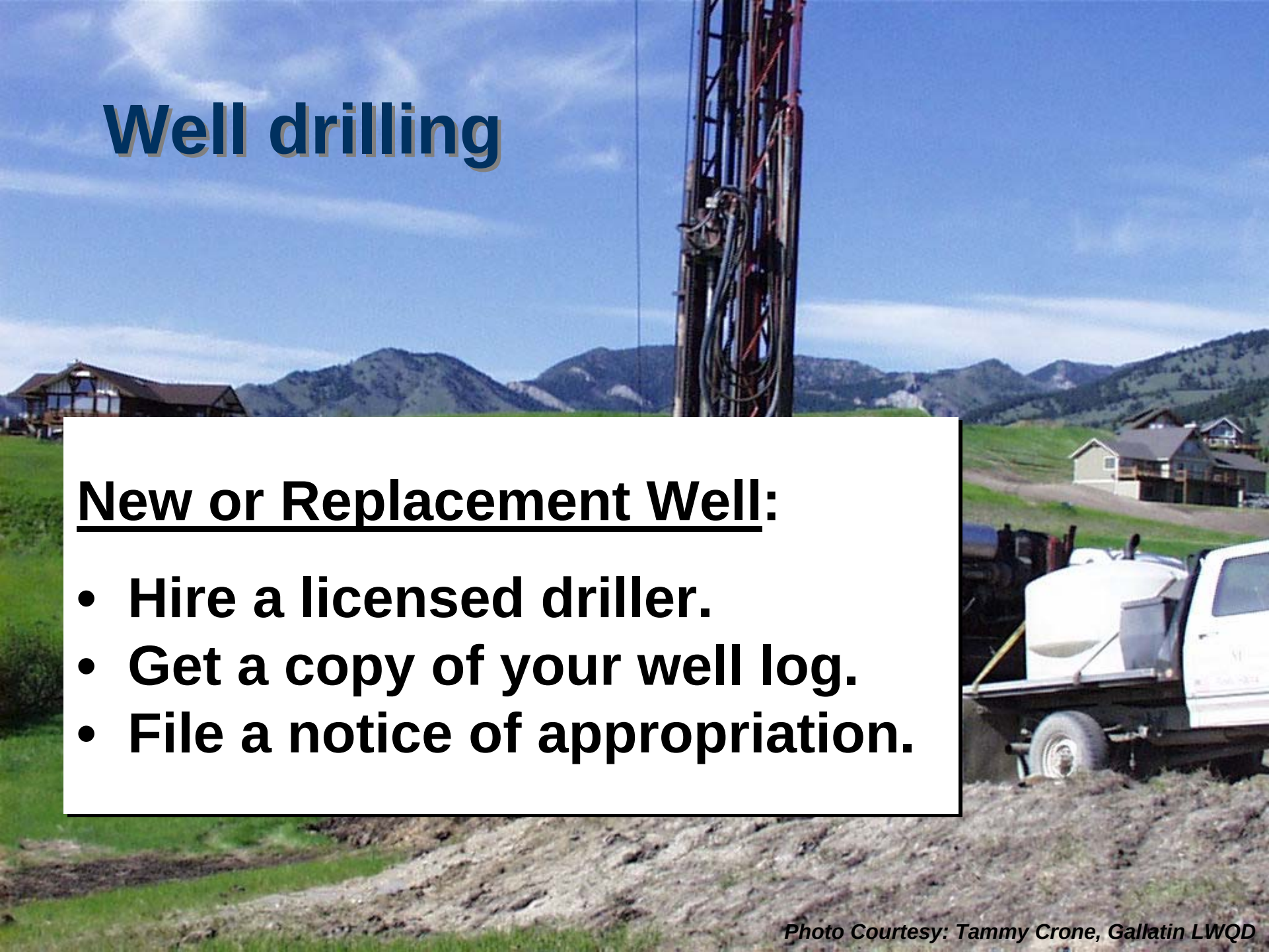

Drop pipe
Pump bowls
Pump motor


Pump intake


Drop pipe


A pipe leak

Well drilling

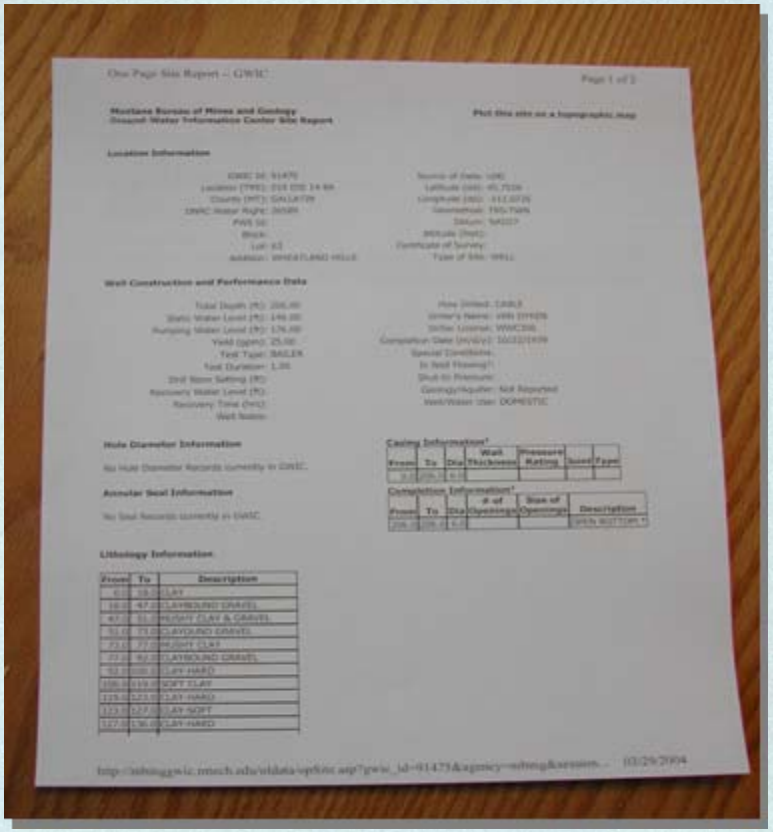


<u>New or Replacement Well</u>:

- **Hire a licensed driller.**
- **Get a copy of your well log.**
- **File a notice of appropriation.**

Photo Courtesy: Tammy Crone, Gallatin LWQD

The Well Log



- Location
- Construction detail
  - –gallons per minute
  - –static water level
  - –Geologic formations (lithology)

Log is filed with GWIC (Ground Water Information Center-MBMG) and DNRC

- By the driller
- A copy of the well log should be provided to the homeowner.

MONTANA WELL LOG REPORT

Other Options

Plot this site on a topographic map
View scanned document (11/3/2006 12:45:18 PM)

Site Name: STATE CAPITOL WELL
GWIC Id: 88689

Section 1: Well Owner

Owner Name
STATE OF MT C/O DEPT FISH WLDLF PKS
Mailing Address
1420 E 6TH AVE

City	State	Zip Code
HELENA	MT	59601

Section 2: Location

Township	Range	Section	Quarter Sections
10N	03W	32	SW¼ NW¼ SW¼ NW¼ NW¼ NW¼

County	Geocode
LEWIS AND CLARK	

Latitude	Longitude	Geomethod	Datum
46.5861	112.0191	UNKNOWN	NAD27

Altitude	Method	Datum	Date
4125			

Addition	Block	Lot

Section 3: Proposed Use of Water
IRRIGATION (1)

Section 4: Type of Work
Drilling Method: AIR ROTARY

Section 5: Well Completion Date
Date well completed: Wednesday, May 29, 1991

Section 6: Well Construction Details
Borehole dimensions

From	To	Diameter
0	215	6

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-2	18	8				STEEL
18	215	6				STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
90	110	6			SCREEN-CONTINUOUS-STAINLESS
155	185	6			SCREEN-CONTINUOUS-STAINLESS

Annular Space (Seal/Grout/Packer)

There are no annular space records assigned to this well.

Section 7: Well Test Data

Total Depth: 215
Static Water Level: 90

Air Test *

70 gpm with drill stem set at _ feet for _ hours.
Time of recovery _ hours.
Pumping water level _ feet.

Section 8: Remarks

Section 9: Well Log
Geologic Source
Unassigned

From	To	Description
0	6	SOIL CLAYEY MOIST
6	10	BEDROCK(HELENA DOLOMITE)-WEATHERED BUFF ORANGE LIME-RICH
10	112	DOLOMITE-SLIGHTLY WEATHERED WEATHERED SURFACES WHITE TO GRAY WHITE LIME-RICH FRESH SURFACES MEDIUM GRAY. 90'-110'=40 gpm
112	117	SHALY DOLOMITE-CHIPS SMALLER BUT STILL BEAR ABUN- DANT LIMONITE STAINING(ABOUT 10% OF SURFACES STAINED):SMALL VEINS OF CACO3 STILL OCCUR ON THE SURFACE OF LARGER CHIPS
117	212	DOLOMITIC SHALE-MED GRAY TO GRAY GREEN;CHIPS SMAL- LER MORE EQUI-DIMENSIONALDRILLING RATE DECREASING IN LOWER PART OF INTERVAL. 192'-197'=80 gpm
212	215	DOLOMITE SHALE-MED GRAY TO GRAY GREEN MUCH LIMON- ITE STAINING;CHIP SIZE LARGER;WELL PRODUCES ABOUT 5 GALLONS IN 2.5 SECONDS = ABOUT 120 GPM

Driller Certification
All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name: TERRY LINDSAY
Company: LINDSAY
License No:
Date Completed: 5/29/1991

Example Well Log

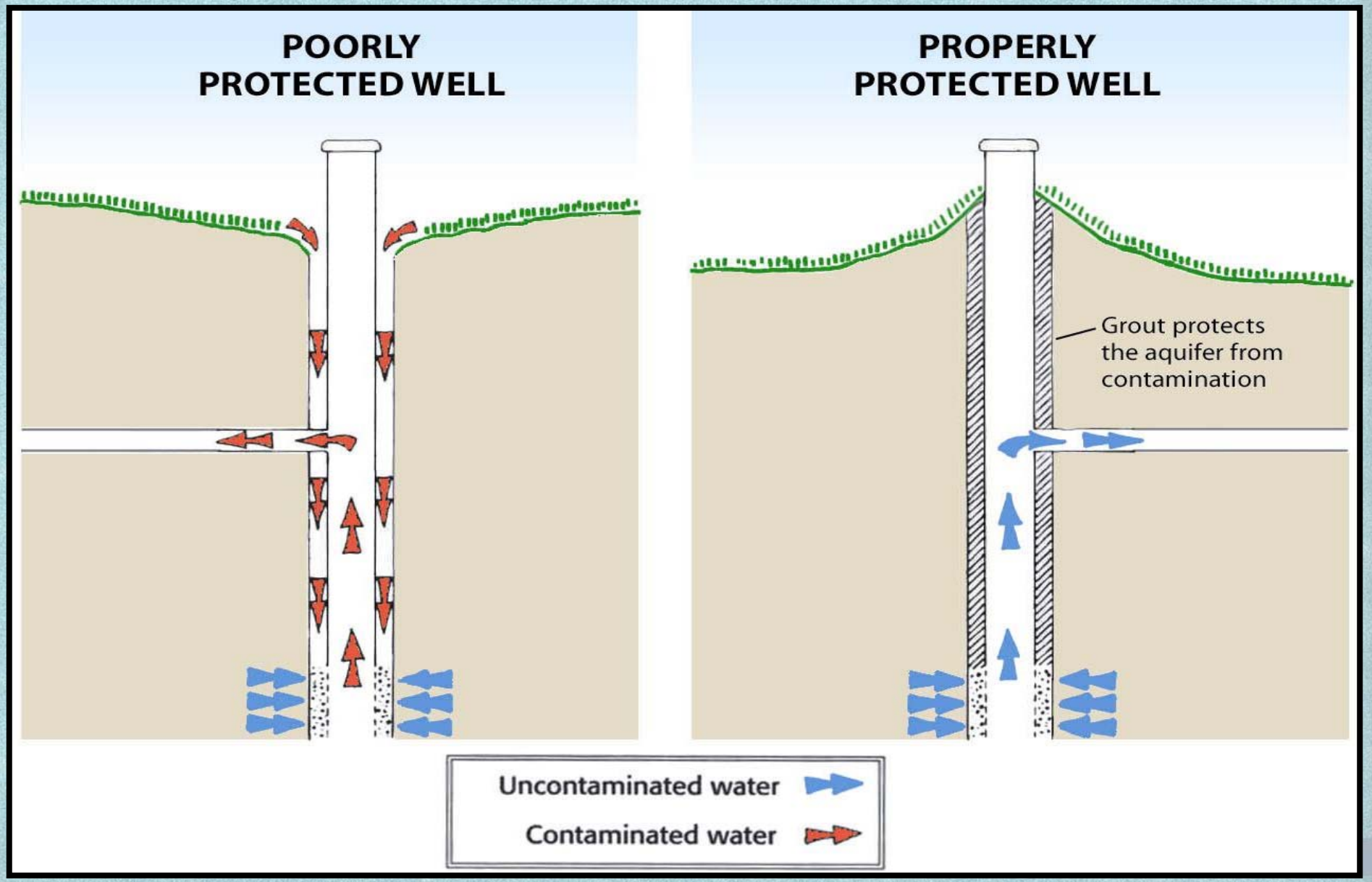
How to find your Well Log

- Go on-line to http://mbmggwic.mtech.edu/ .
- Contact local DNRC office
- Contact Joe Meek at DEQ at (406) 444-4806

Note: identifying your well log can be a challenge; have as much information available as possible such as:

  - original owner name & well location
  - approximate date completed
  - approximate depth

Construction:

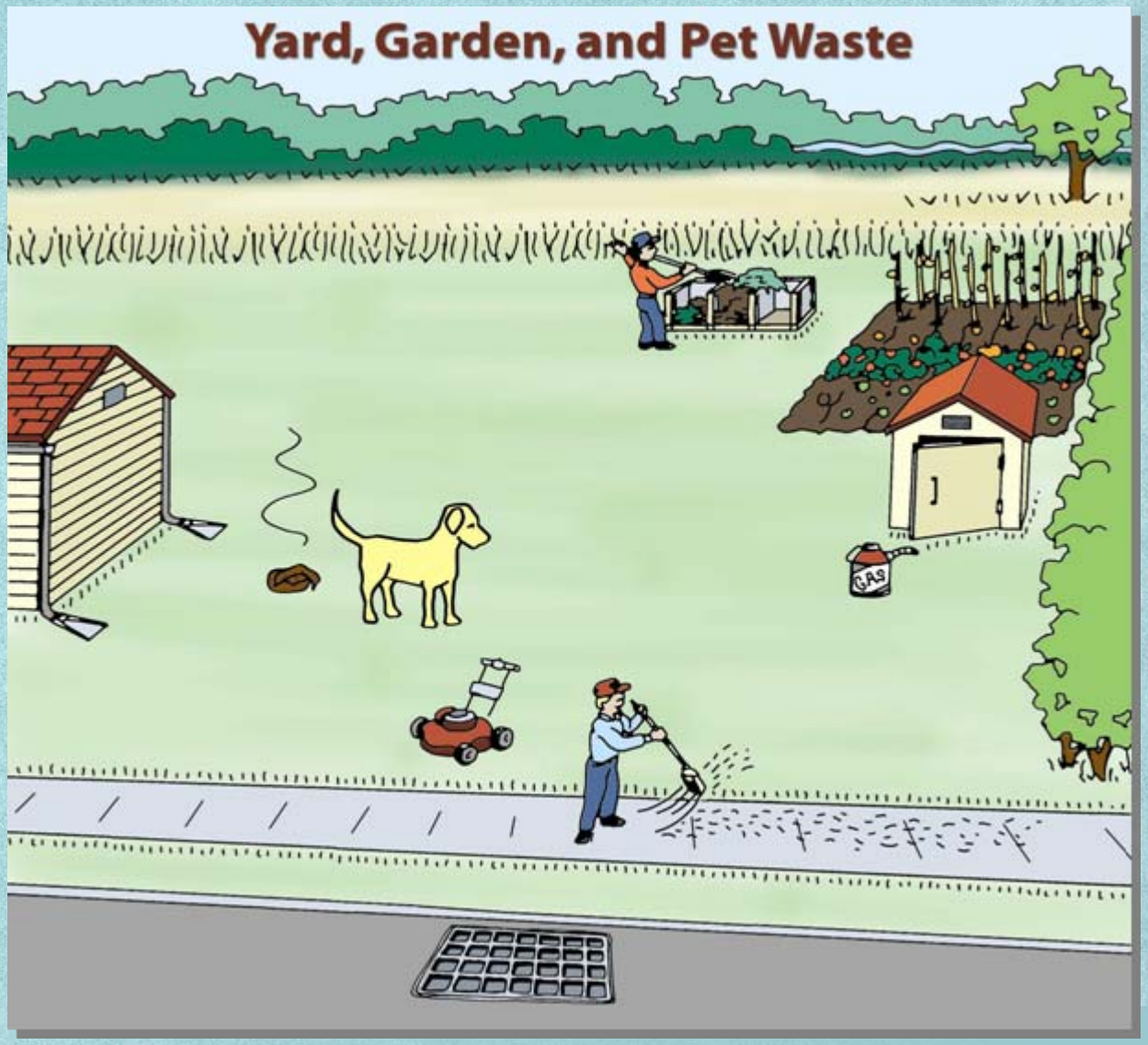


Ground Water Pollution Sources

Wells, 100-foot protection zones, and septic system drainfields are too close in some of our older areas

Run-off into ground water

Break-down of wastes can leach to ground water. Diffuse sources are called “non-point pollution”




Manure should be managed to prevent heavy build up

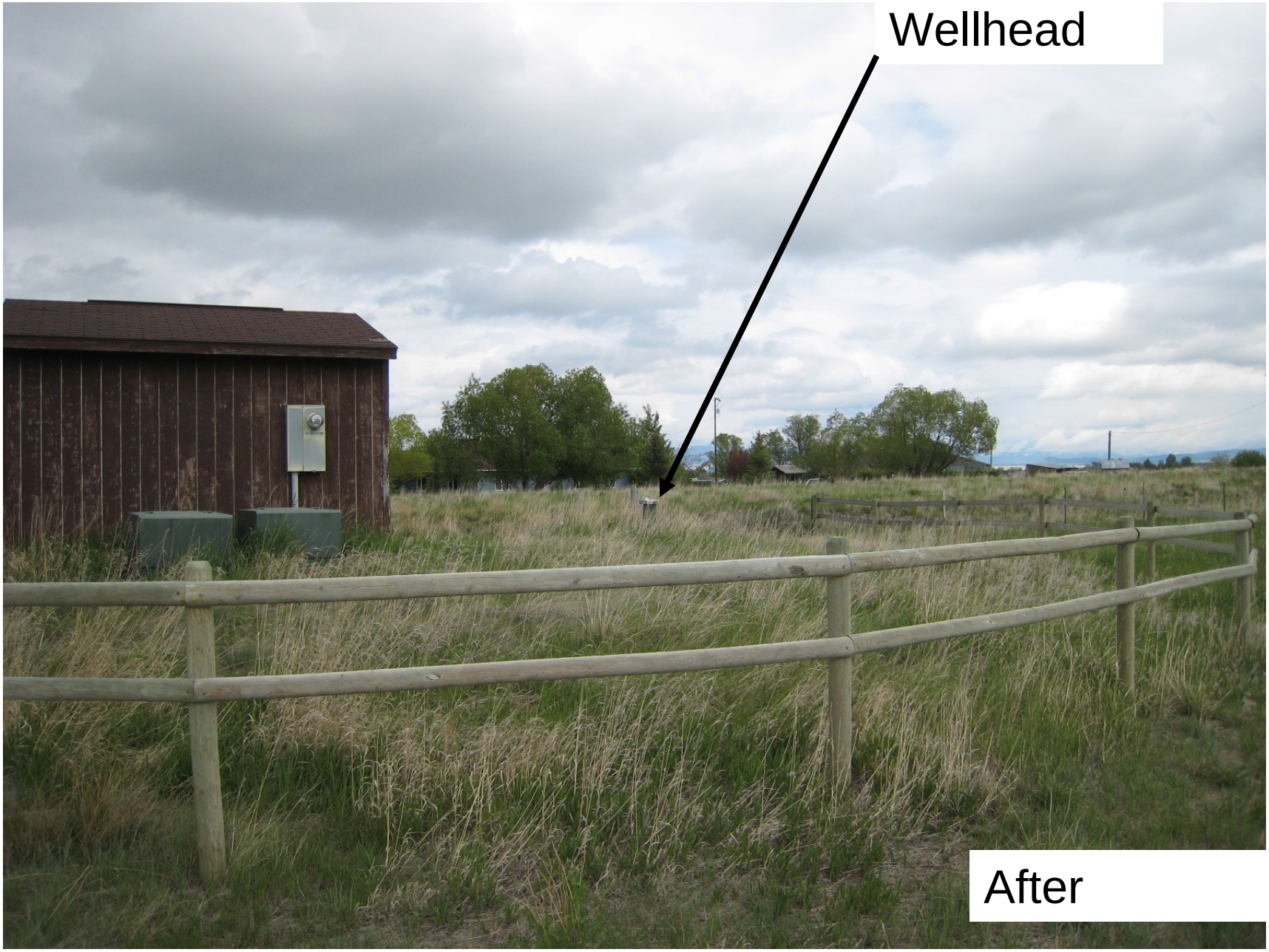
Contaminated leachate from manure in corral will recharge ground water.


Manure dumped into coulee is not good waste management

Manure dumped into coulee is not good waste management


Is this recharging your aquif

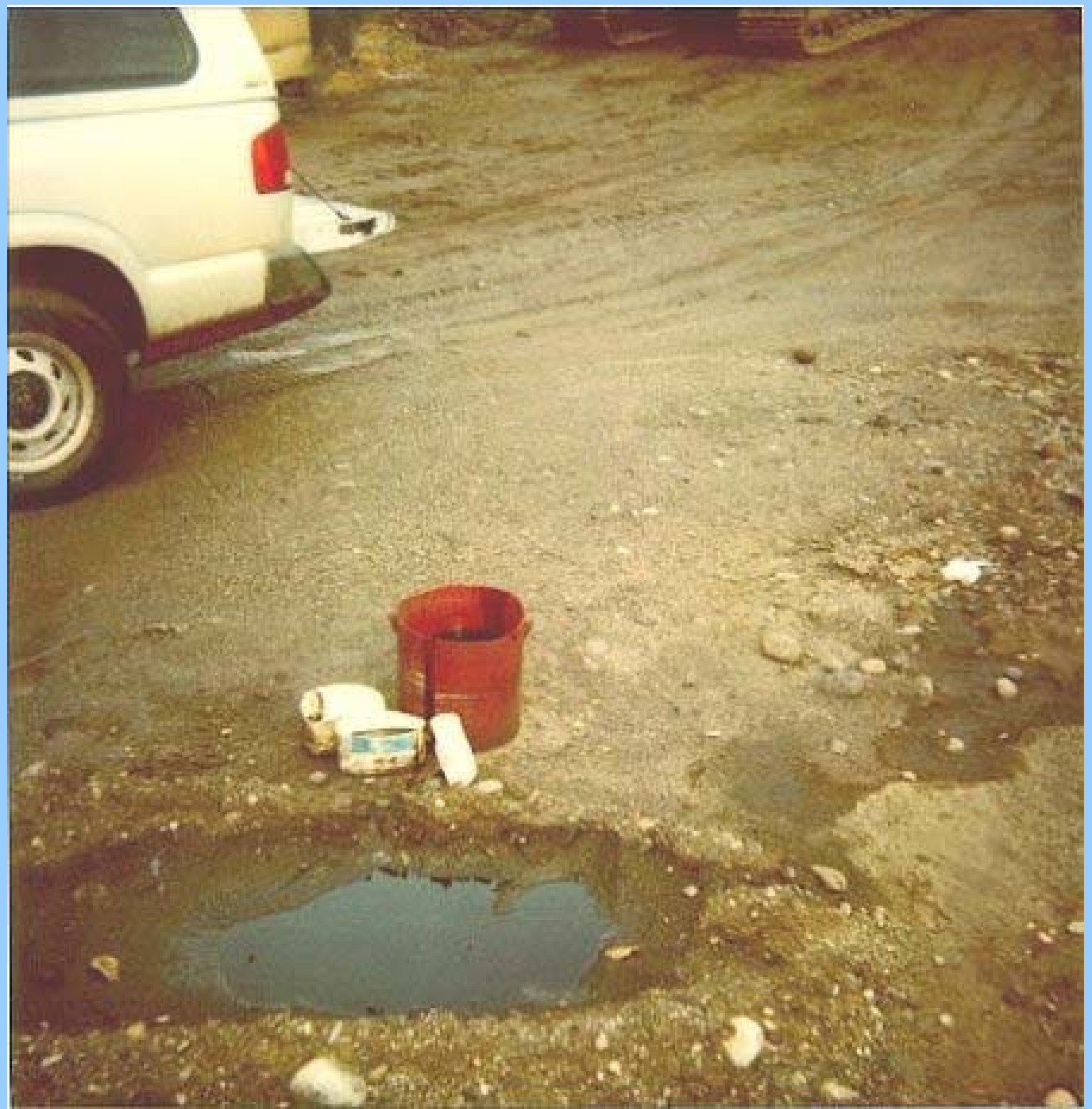
Keep livestock away from wells


Wellhead
After

Composting manure for use as garden fertilizer

Don’t dump waste onto ground.

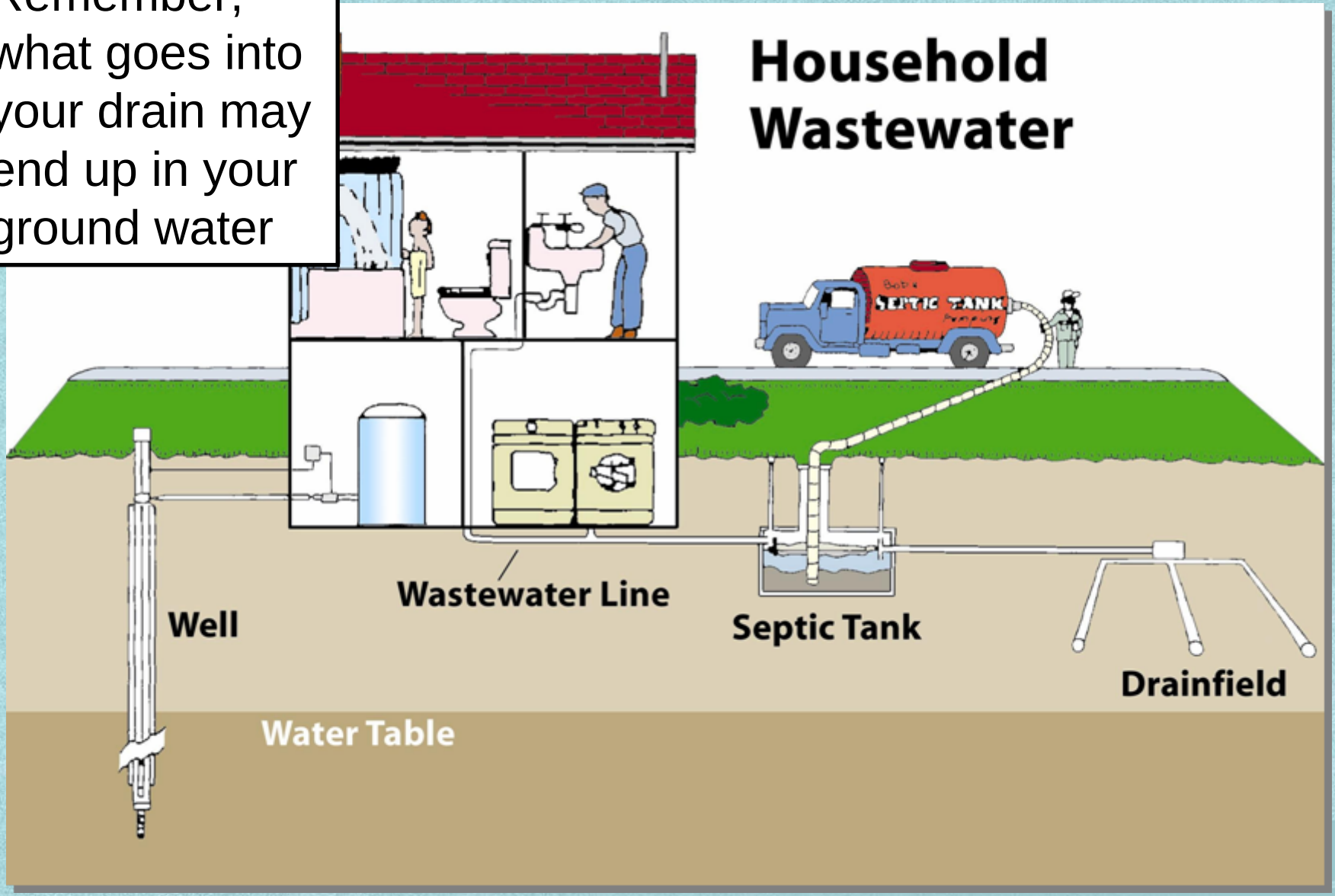
Waste motor oil can be recycled!



Household Hazards

- Cleaning products
- Automotive products
- Chemicals & fertilizers
- Unused prescription and medications

Remember, what goes into your drain may end up in your ground water



Who Protects My Drinking Water?

- YOU…are responsible for the safety of your drinking water.
- Be aware of area conditions

Common Drinking Water Contaminants

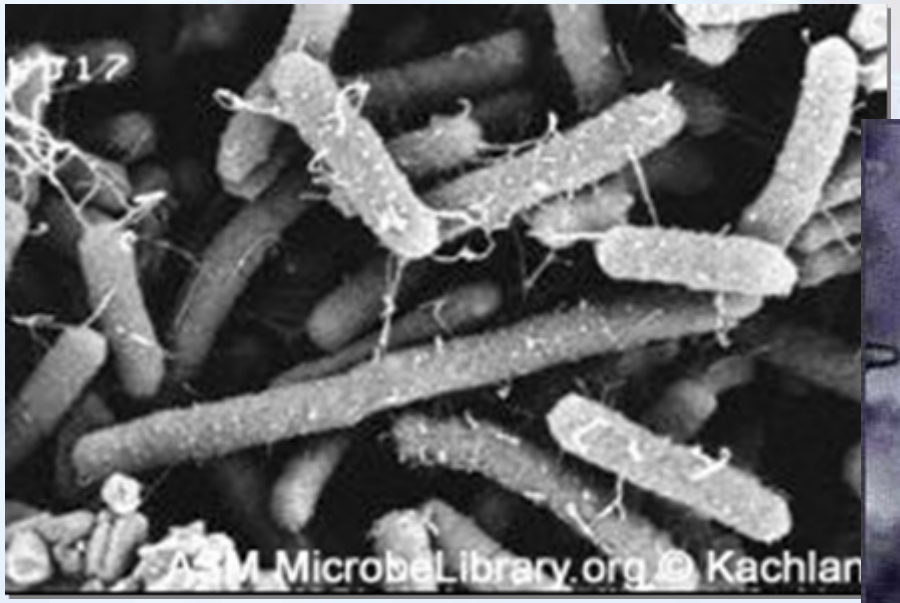
- Biological
- Chemical
- Physical

Pathogenic Microorganisms

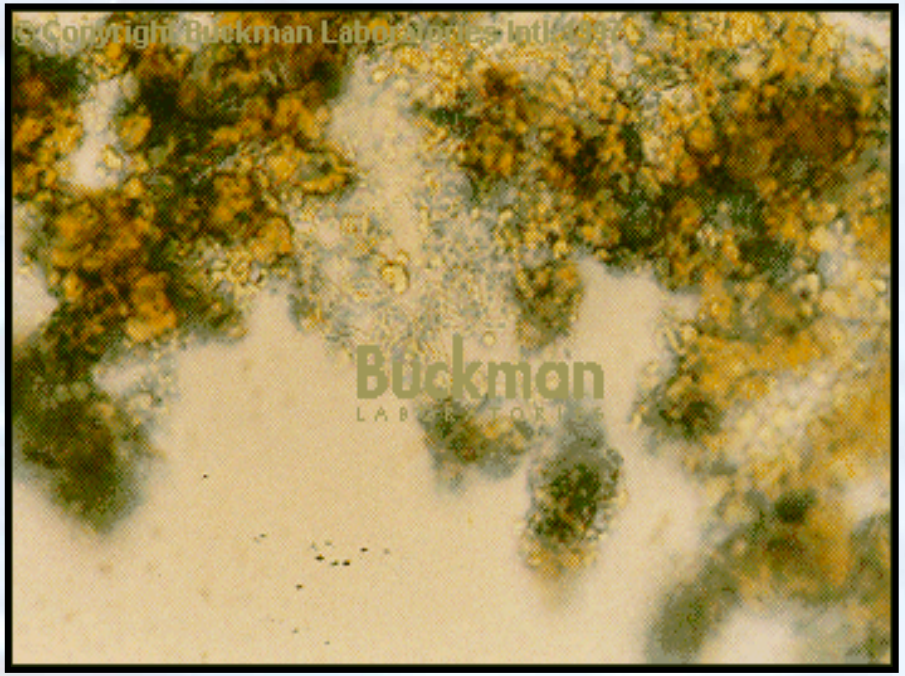
Fecal coliform bacteria *(E. coli)*

Giardia

Viruses (Norovirus)



Nuisance Bacteria



Iron bacteria

- iron deposition
- slime in fixtures
- biofilm in plumbing

Chemical Contaminants

- Petroleum products
- Metals
  - Arsenic
- Nitrogen (nitrates)
- PPCP

Physical Characteristics

- Turbidity
- Taste
- Sediment
- Odor
- Color

Water Testing

Once a Year Test For

- coliform bacteria
- nitrate and pH (acidity)
- if pH is less than 7.0, test for lead.

Or at change in taste, odor, or appearance

If you have never had your water tested, or if you don't have any record of previous tests, test the for the following:

- **Coliform Bacteria**
- **Nitrate/nitrite**
- **pH (acidity)**
- **Chloride**
- **Iron**
- **Sulfate**
- **Hardness**
- **Alkalinity**
- **Total Dissolved Solids**
- **Manganese**

Bedrock well

- **add Arsenic, Radon, Fluoride**

Where Can I Have My Water Tested?

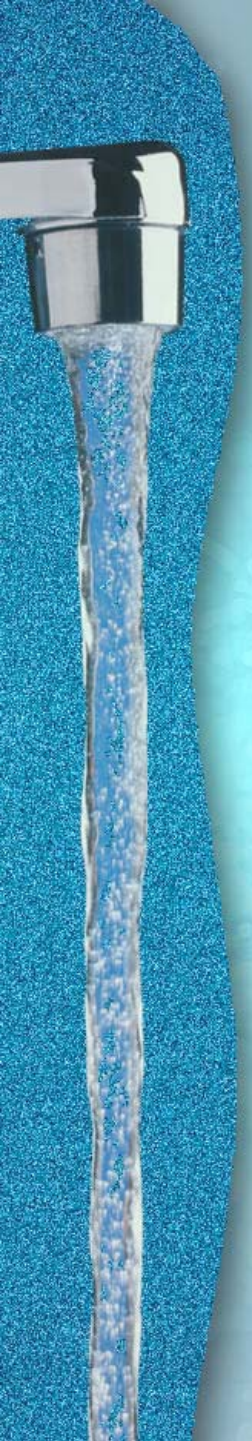
- Some local labs:
  - Energy Laboratories-Billings
  - State Laboratory in Helena

Poor sampling technique is worse than not sampling

What Do the Results Mean?

- Compare to standards
- If high, DO NOT DRINK THE WATER!
- Watch trends
- Treatment or new source may be option

Typical home treatment systems



Sediment filter

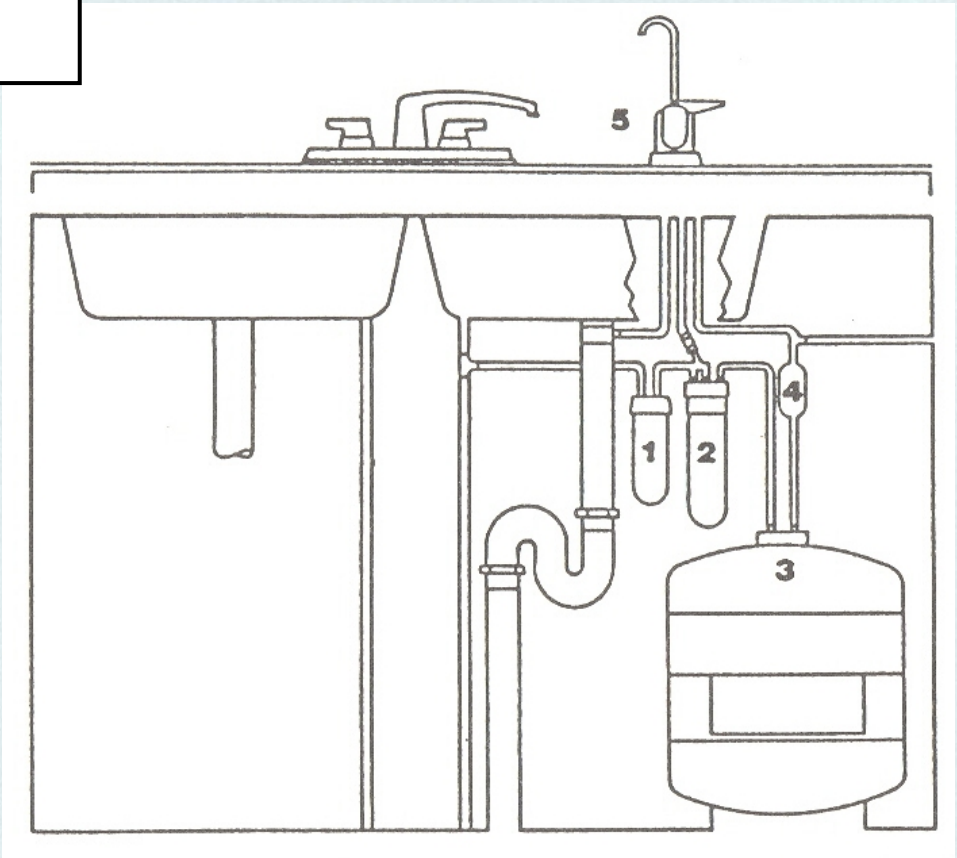
Sediment filter and softener

Iron Filter or Greensand Treatment Unit.

Filter for iron, manganese, and/or sulfur odor treatment

Under sink treatment system

Under sink treatment system schematic



Top 10 Well Maintenance Tips

1. **Regularly test your water…coliform & nitrate**
2. Keep household hazardous materials away from your well.
   - Never dump down drain or on your property
3. Limit use of lawn & garden chemicals
   - Apply sparingly & follow application instructions

Tips!!

4. Take care in working around your well to prevent damage to the well casing.
   - Don’t pile snow, leaves, or other materials around your well.

5. Keep your well records in a safe place
   - **Well log…..find it if you don’t have it**

6. Periodically inspect well parts for damage:

- **Broken or missing cap**

- **Wire insulation has failed**

Be careful working at your wellhead!

- **Cracked, corroded or damaged casing**


• Watch for settling and cracking of ground surface around casing.

Replace non-sanitary well cap...

…with one that has a sanitary seal.

Non-sanitary cap

Sanitary seal cap

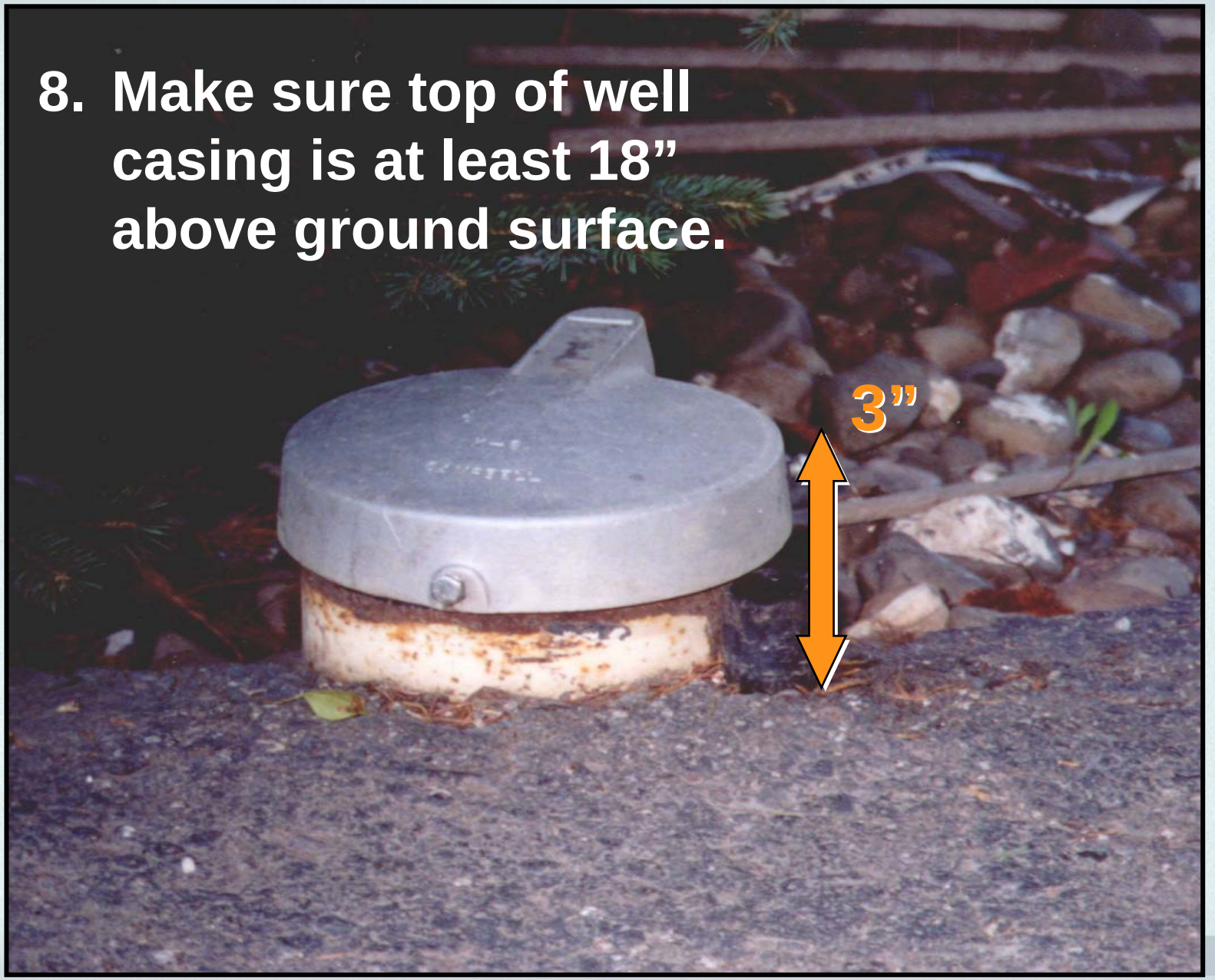
7.When landscaping…

Avoid planting flowers at wellhead since they will require watering and need to be fertilized.

7.When landscaping…

Slope ground away from casing for proper drainage.

8. Make sure top of well casing is at least 18” above ground surface.



9. Install backflow protectors on all outdoor faucets

10. Hire a certified well driller for any new well construction, modification or abandonment and closure.

Tips!!

For Additional Information:

Joe Meek MT DEQ (406) 444-6697